

AN EVALUATION OF THE EVACUATION CHALLENGES FACED BY THE CITY  
OF DELRAY BEACH

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## Abstract

The purpose of this research is to identify successful methods to insure residents vacate mandatory evacuation areas prior to the landfall of a hurricane. The problem is that the City of Delray Beach Fire Department is responding to an increasing number of requests for assistance during, and after hurricanes in mandatory evacuation areas.

The research was conducted utilizing descriptive research methods to answer the following research questions; how widespread is the problem? How do we evacuate those with special needs? What is being done at the local, state, and federal level to deal with the problem? What public education programs are currently in place to address the problem?

The research was conducted utilizing books, journals, personal interviews, department documents, a survey, and the internet to gather information on hurricane evacuation. Some of the findings from the research included the current impact of the problem, special needs evacuation programs, government programs directed at the problem, and public education efforts targeting the problem.

The recommendations from the research indicated that the department must do a better job of recognizing the significance of the problem, planning prior to an event, communicating the hazards to citizens through public education, and continue to seek financial resources through various government programs.

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## Introduction

In August and September of 2004 the state of Florida was struck by four major hurricanes named Frances, Jean Wilma, and Charley. All four of these storms had significant impact on the residents of the City of Delray Beach. During these storms more than 30 % of the city's residents were ordered to evacuate as their residences are located within a mandatory evacuation zone. (PBC.gov, 2008) The department is receiving an ever increasing number of calls for service during and immediately subsequent to the hurricanes. In many cases these are life threatening emergencies which require firefighters to respond under extremely dangerous conditions. Some estimates show that as many as 33 percent of these residents do not heed the evacuation orders when issued. (Harvard, 2006) The reason this is a problem is that when firefighters respond under these types of conditions, they face significant exposure to injury and death from a multitude of hazards. These hazards include flying debris, poor visibility, downed power lines, gas leaks, flooding, and other dangers.

The problem is that the City of Delray Beach Fire Department is responding to an increasing number of requests for assistance during, and after hurricanes in mandatory evacuation areas. To date, there has been no significant effort to reduce these responses. Failure to comply with these orders unnecessarily places both the citizens and firefighters at great risk. The purpose of this research is to identify successful methods to insure residents vacate mandatory evacuation areas prior to the landfall of a hurricane.

The author of this applied research paper will utilize descriptive research and the following four questions to guide the researchers' efforts: How widespread is the problem? How do we evacuate those with special needs? What is being done at the

county, state, and federal level to address the problem? What public education efforts are currently in place to address the problem?

### Background and Significance

The Delray Beach Fire Department is located in Southern part of Palm Beach County in Southeast Florida. The area served by the department includes the City of Delray Beach and the Towns of Gulf Stream and Highland Beach. All three communities are situated directly along the coast on the Atlantic Ocean. The combined population served by the department is approximately 75,000 and covers 17 square miles. The department has a total complement of 151 personnel including 143 certified firefighters. (DBFD annual report, 2007) From its six stations, The Delray Beach Fire Department provides fire suppression, advanced life support emergency medical services, prevention, inspection, hazardous materials response, and a multitude of other community oriented programs. The daily shift staffing is 33 emergency response personnel. The department is currently responding to more than 12,000 emergency requests for service annually.

The challenges surrounding evacuation initially came to light during the 2004 and 2005 hurricane season during which the City of Delray Beach was heavily impacted by three major storms. The problems surrounding evacuation clearly existed prior to this however; it lacked attention due to the fact that there had not been a major hurricane to strike South Florida since Hurricane Andrew in 1992. During and after these storms the department received numerous requests for service in areas that were under mandatory evacuation orders. Many of these requests were made during the peak of the storm placing personnel at serious risk during their response. The types of requests included; collapsed structures with occupants trapped, major and minor medical emergencies,

structure fires, gas leaks, and removal of elderly occupants from upper floors of hi-rise condominiums due to power failure.

The City of Delray Beach Hurricane Plan includes provisions to evacuate two fire stations that are both located on a barrier island and within 200 feet of the shoreline to the mainland after mandatory evacuation orders are issued. Access to the barrier island is limited to 3 bridges that access approximately 7 miles of coastline. The barrier island is also the most densely populated area in the city containing numerous hi rise condominiums and multi family dwellings. The failure to evacuate prior to a storm unnecessarily places personnel at risk and inhibits the organizations ability to achieve its mission. This problem is not unique to the City of Delray Beach and clearly affects numerous other coastal cities in South Florida.

The problem that exists in the City of Delray Beach has many significant connections to Executive Analysis of Fire Service Operations in Emergency Management course in the Executive Fire Officer Series. A review of the city's community risk/capability assessment reveals that hurricanes are a high risk event affecting the city and are becoming higher in frequency. A hurricane is one of the few types of disasters in which we have adequate warning of when it will occur. Reducing unnecessary requests for service inside mandatory evacuation areas would enable the organization to more effectively manage its limited existing resources.

The problem is related to three of the USFA operational objectives which include; 2,500 communities will have a comprehensive multi-hazard risk reduction plan led by or including the local fire service, by reducing by 25 percent the loss of firefighters, and to appropriately respond in a timely manner to emergent issues.

Reducing responses under dangerous conditions reduces firefighter exposures to injury and death. Because this problem is an emergent issue it should be updated and included as a component of the city's comprehensive emergency response plan.

### Literature Review

How widespread is the problem? A recent study was completed by Harvard University which surveyed residents located within fifty miles of the coastline in eight states that are at high risk for hurricanes. When asked, "If government officials said that you had to evacuate the area because there was going to be a major hurricane in the next few days, would you leave the area or would you stay?" Thirty three percent responded that they would stay. (Harvard, 2006)

A similar study of hurricane preparedness and evacuation was conducted by the Mason Dixon Polling and Research Co. The poll was conducted in May of 2007 and also targeted those residing in hurricane vulnerable states. Their findings reveal that fifty three percent don't feel vulnerable to a hurricane or subsequent flooding. Sixteen percent of respondents stated, "They might not or would not evacuate even if ordered to do so, leaving thousands of residents at grave risk in the path of any given storm." (National Hurricane Survival, 2007)

The release of these highly publicized polls prompted many local newspapers to conduct their own polls. One such study was conducted by the Post and Courier in Charleston S.C. The question was posed that if an evacuation order was declared, would you leave? Their poll had 647 responses with fifty seven percent answering that they would not leave. (Charleston.net, 2008)

The state of Florida also completed a poll in 2007 titled the Florida Hurricane Mitigation Poll. This study was conducted in conjunction with the International Hurricane Research Center and Florida International University. The survey was conducted from July 7 through July 15, 2007 to 800 permanent residents of Florida. 15.4 percent of the respondents replied that they would never evacuate even if there was a mandatory evacuation order. This study also revealed that respondents whose homes are in an evacuation zone are no more likely to evacuate than respondents not in an evacuation zone. (FIU, 2007)

In August 2005, Mayor Ray Nagin declared a state of emergency and ordered the evacuation of the entire city of New Orleans. It is estimated that in the city of 1.3 million, only 1 million evacuated. (CNN, 2005) Most stayed in their residences however, between 20,000 and 25,000 evacuated to the Superdome, a refuge of last resort, to ride out the storm. These folks again had to be re-evacuated subsequent to the passing of the storm to a safer location.

When hurricane Ike struck the Texas Gulf Coast in September 2008, the failure of residents to evacuate hampered responders attempts to manage the incident. If evacuation orders were heeded, emergency management officials could have started to transition to the recovery phase of the incident focusing on bringing up critical infrastructure. Instead, the response phase was extended to attend to those that did not heed warnings. “They didn’t need the added demand of responding to people who decided not to heed evacuation warnings despite having the means to do so and ended up in dire situations, creating emergencies that didn’t need to happen.”(Miner, 2008) As many as 140,000 people in mandatory evacuation zones did not evacuate ahead of Ike in



spite of a seven day warning period. News reports stated that there were over 2000 rescued from flooding and collapsed homes. (Kaye, 2008)

Hurricane Carla struck Galveston in 1961. Historical data about the event reveals that a significant number of residents ignored evacuations orders. “About 70 to 80% of Galveston residents stayed on the island even though most knew that they would eventually be cut off from the mainland.”(Auf der Heide, 2000)

The findings in this section of the research influenced the focus of the research as it relates to question 4, what public education efforts are currently in place to deal with the problem.

How do we evacuate those with special needs? It is important to remember that the usual methods of support and assistance may not be available for some time during an evacuation and after the disaster has occurred. People with special needs should include those considerations in their emergency and preparedness planning.

Although the requirements for qualification as a special needs person tends to vary slightly according to the local jurisdiction, they seem to have some common requirements. The City of Jacksonville defines a special needs patient as, “A person qualifying for special needs is someone who is medically dependent on electricity (i.e. electricity needed for life supporting equipment). This may also include a person with regular need for assistance with medications and/or observation, dementia, chronic conditions that require assistance and persons with contagious health conditions that require minimal precautions or isolation.” (COJ, 2008) The State of Missouri defines a special needs person as any individual, group, or community whose age, physical, mental, emotional, cognitive, cultural, ethnic, socio-economic status, language,

citizenship status, or any other circumstance creates barriers to understanding or the ability to act/react in the manner in which the general population has been requested to proceed during all phases of emergency management. (Davidson, 2007)

More than one third of Florida's 6,341,130 households include at least one person with a disability. (No Person Left Behind, 2005)

Many Comprehensive Emergency Management Plans incorporate a system by which those with special needs pre register with an appropriate agency. This process serves multiple purposes. The data can then be utilized to determine how many special needs patients are located within a jurisdiction. From this, managers can pre plan to ensure the appropriate facilities and staffing are available to those that need to be evacuated.

One of the most labor intensive and time consuming processes prior to a hurricane is the transportation of special needs patients to appropriate facilities. The Florida Healthcare Association has conducted a review of the 2004 and 2005 hurricane seasons and has determined that existing disaster plans have not adequately addressed transportation arrangements. Experience has shown that transportation contracts do not always hold up during a time of need. In many cases it was discovered that private transportation providers had entered into numerous contracts with multiple agencies which they simply could not fulfill. (Alphasano, 2007) A report from the National Research Council's Transportation Research Board addresses the potential role of public transit in emergencies. They highlight the fact that transit systems could play a significant role in transporting careless and special needs populations in times of emergency, but these groups are inadequately addressed in most local emergency plans

and evacuating them could easily exceed limited transit resources. (Medical News Today, 2008) The article goes on to highlight the fact that the use of such a system is not currently eligible for cost reimbursement from FEMA.

A review of the Miami-Dade County evacuation plan for those with special needs revealed a combination approach to their process. For those that will be transported to special needs shelters, the school board will provide transportation via school busses. Those that need transportation to medically managed facilities will be transported by Fire Rescue, special transit services, and private ambulance. (Miamidade.gov, 2008)

The findings of this research assisted with the development of the survey questions to determine what resources are currently being used to transport special needs patients.

What is being done at the local, state and federal level to address the problem? The National Response Plan and the National Incident Management System both recognize the role of state and local governments as the first line of emergency response to disasters. This response includes evacuation and sheltering of victims. The initial orders for evacuation are typically initiated by the local county, parish, or city in coordination with the state. (U.S.DOT 2006)

The most prevalent activity with regards to evacuation at the local level had to do with pre registration of special needs evacuees. Many of the local evacuation plans evaluated in the report to congress mention some type of pre registration process for those with special needs. The processes utilized include; internet registration, phone registration, and registration by mail. A review of multiple county websites revealed that a majority utilized a phone or on line registration process. A pre registration process

enables a local agency to establish contact with the special needs person so their needs are met. It also gives them the data they need to plan for the future transportation and sheltering needs. These plans are well organized however there are some significant deficiencies. “The Alachua County Florida plan reports 450 special needs clients have pre-registered with the Emergency Management Office in order to ensure they will be evacuated during a catastrophic emergency. However, there are thousands of other people with special need who are not registered.” (U.S. DOT, 2006)

Hurricane Katrina brought to light the problems with evacuation at the local level. Since then additional attention has focused on the need for better planning with regards to evacuation. The City of New Orleans was the subject of much criticism following the widespread media reports of the 200 school busses that were submerged under water following Katrina. One media report questioned, “Why weren’t those busses sent street by street to pick people up prior to the storm?” (Myers, 2005)

Many of the plans reviewed had provisions for the use of private contractors to aid in the evacuation process. “Following hurricane Katrina, Clay county Florida reviewed all of its nursing home emergency plans and discovered they all had the same vendor.” (U.S. Dot, 2006) Clearly in a time of emergency, one vender is not capable of evacuating all of the nursing homes in one county. The county was able to issue a directive to ensure each home had identified a backup vender. This prompted them to look at using local transit and school busses for this function as well.

The researcher was able to locate widely varying projects and initiatives at the state level with regards to evacuation. The most aggressive program was in the State of Texas with a partnership between the State and AT&T. Following Hurricane Katrina in

2005, 470,000 evacuees ended up in Texas, including 9,000 special needs cases and 2,000 children who arrived without parents. (Mysabusiness.com, 2007) State officials saw a need to more efficiently track evacuees and teamed with ATT to develop a program. The program is called the Special Needs Evacuation Tracking System which is a system that tracks evacuees electronically using the latest technology. The process is simple and is administered by the National Guard. When an evacuee enters the system he/she is registered in a laptop computer and is given a barcode bracelet. If the person enters a staging area or means of transportation, the bracelet is scanned and is attached to that unit which is then GPS tracked. The person is then scanned into their final destination. All of this is updated in real time utilizing ATT's existing cellular network. This allows emergency managers to monitor evacuations in real time and provide accountability for the evacuees. The system even has the ability to correlate microchips embedded in pets to ensure they are reunited with their owners after an emergency is over. According to a State Division of Emergency Management official, the State wanted to upgrade their tracking capability of evacuees, "We wanted to enhance our existing emergency evacuation planning strategy with a new system for tracking and locating evacuees" (BABCO, 2007)

The State of Florida has also embarked upon a program to incorporate technology in the evacuation process. "The Florida State Emergency Operations Center Mapper program allows the SERT staff to use the GIS to remain current on events as they unfold and obtain information about locations of shelters, logistics area, and command posts." (U.S. D.O.T., 2006) The program also has the ability to monitor and post reports on traffic management. This information is accessible to all local EOC's who can then use it

to direct the public. The real time reporting of accurate information during the evacuation process is critical due to the complexity of the traffic management program. These traffic programs incorporate contra flow traffic patterns which are not used frequently and are unfamiliar to motorists.

To assist with evacuation efforts the State of Florida also addressed fuel issues. When Hurricane Rita affected the Houston area in 2005, many were left stranded along major evacuation routes. “People can't evacuate or return home without sufficient gasoline supplies along the highways.” (My Fox Houston, 2008) In an effort to address evacuation and the eventual return of residents, Florida did pass a law requiring gas stations to install generators to ensure availability during emergencies. The law only applies to stations within one mile of major evacuation routes and state and federal highways.

The researcher discovered numerous programs taking place at the federal level with regards to hurricane evacuations. In fact there are several programs that involve multiple federal agencies working cooperatively addressing issues. Most notably is the Report to Congress on Catastrophic Hurricane Evacuation Plan Evaluation. This report was jointly compiled with the U.S. D.O.T. and the Department of Homeland Security. The report contains valuable information that can be used at the state and local levels to improve evacuation of residents in the face of a hurricane.

At the federal level there are numerous grants available to state and local level governments. The DHS budget for grants for the training and technical support of state and local governments has been increasing. In the FY 2006 the total budget was \$3.6 billion. That was increased and additional \$1.4 billion in FY 2007, and increased another

\$2.6 billion in FY 2008. (Abramson, 2008) From this money, FEMA has made available a Regional Catastrophic Preparedness Grant Program. According to their website, the “RCPGP provides \$60,092,500 to advance catastrophic incident preparedness to address all threats and hazards in collaboration with federal, state, and local partners.” (FEMA, 2008) Funds from this program can be utilized to aid in the efforts to more effectively evacuate residents before a hurricane.

This section of the research influenced the project by bringing to light the importance of the private sector in dealing with the problem. It indicated there is a significant role for them to play in emergency management to contribute to the overall success.

What public education efforts are currently in place to address the problem? At the local level, public education with regards to hurricane evacuation seems to be limited to the websites of the individual cities, and county’s. At the state level there are programs aimed at educating the public regarding the need to evacuate when directed by authorities. In 2006, the state released a public safety announcement that was played on local radio, and television stations of a panicked 911 caller requesting a response to an area that was ordered to be evacuated. The 911 dispatcher’s response was that they would be unable to respond until after the storm. (Floridadisaster.org, 2006)

After the 2004-2005 hurricane seasons, the State of Florida instituted a sales tax holiday lasting for 10 days for the purchase of hurricane supplies. This program was timed to begin just prior to the beginning of hurricane season and was heavily promoted by both the state and private business. In 2007 this generated \$12 million in sales tax savings to Florida consumers. (Peltier, 2008) The program also provided numerous

opportunities to educate the public regarding hurricane preparedness and evacuation. Many of the retailers handed out free educational material to customers and even produced their own public service announcements which they included in their commercials.

At the Federal level there are also many efforts focused on education of the public affected by hurricanes. The CDC has a very comprehensive website for officials involved in hurricane evacuations. The site includes numerous audio and video files that local and state officials can provide directly to the media for broadcast. These files are specific to the type of emergency an area is experiencing and are selected by the local official. The site has the following message targeted directly at hurricane evacuations, “This is an important message from the U.S. Department of Health and Human Services. If a hurricane warning is issued for your area, or authorities tell you to evacuate, take only essential items. If you have time, turn off gas, electricity, and water and disconnect appliances. Make sure your automobile's emergency kit is ready. Be sure to take prescription drugs with you. Follow the designated evacuation routes and expect heavy traffic. To learn more, contact your local emergency management authorities.” (CDC, 2008)

FEMA, along with the State of Texas have embarked upon a public safety education program titled “Knowwhat2do.” The program revolves around three basic principles with regards to emergencies, think, prepare, act. The act component of the program directly addresses evacuation and how to accomplish it. It stresses the development of an evacuation plan prior to an emergency with key elements such as,



where to go, how to get there, and what to take. The program is simple with only the necessary information included. ( Knowwhat2do.com, 2008)

The research in this section influenced the study by defining how narrowly focused public education efforts regarding hurricane evacuation are. It assisted the researcher in developing the survey questions that consider non traditional ways to effectively educate the public.

### Procedures

This researcher will utilize descriptive research on several different sources to develop the research base in order to provide answers to the research questions. The researcher began the search for source material on hurricane evacuation at the National Fire Academy Learning Resource Center. The researcher was able to locate an extensive amount of material pertaining to hurricane evacuations and much of it was published in the last two years. The internet research yielded significant information on the specific subject of evacuation prior to hurricanes. The researcher did utilize much of this material from government agencies which is cited extensively in the literature review section. Additionally DBFD documents were also utilized for reference.

The researcher also conducted numerous personal interviews with Asst. Chief John Tomaszewski throughout the research process. Chief Tomaszewski was chosen because he is the current Emergency Management Coordinator within the department. In addition to personal interviews, Chief Tomaszewski was able to provide the researcher with information about the city's emergency management program from its inception as he has been the only person to fill this position from the time it was created. Additionally, Chief Tomaszewski wrote the city's comprehensive emergency

management plan. All of the personal interviews took place between September 24, 2008 and October 7, 2008.

- 1) Can you tell me a little bit about your role and responsibilities as the department Emergency Management Coordinator?
- 2) Is hurricane evacuation adequately addressed in the Comprehensive Emergency Management Plan?
- 3) How successful are the community education programs that have been implemented in addressing the problem?

In order to gain further data to answer the researchers' questions, a survey was prepared. The survey was developed utilizing the research questions as a guide. Additionally, the questions were formulated based on research completed. Two survey questions were prepared for each research question. The survey was reviewed by Chief Tomaszewski for review prior to administration. All questions were forced choice questions in a multiple choice format.

The survey was distributed to the Palm Beach County Training Officers Association on October 15, 2008. It was delivered via the email list of members kept by the organizations president. At the time of distribution the list contained 57 persons with representatives from every city, county and private provider of fire and rescue services in Palm Beach County. Of the 57 persons to whom the survey was distributed to 27 were returned. The 27 that were returned represented all but one very small organization located within Palm Beach County. The returned surveys were representative of 17 of the 18 fire rescue departments in Palm Beach County.

The following is a list of limitations and assumptions that may have had an affect on this applied research project: The comparatively small amount of research available explicit to evacuation of coastal residents prior to a hurricane. Time constraints placed on the researcher due to other collateral responsibilities. The sample pool for the survey is in close proximity to the Delray Beach Fire Department.

## Results

### Research Question #1

How widespread is the problem? According to the research, the problem appears to be very widespread. A clear majority of the respondents had responded to a call for service during or subsequent to a hurricane in a mandatory evacuation zone. This is consistent with the research conducted which shows a high percentage of residents don't evacuate in the face of an approaching hurricane. Questions 1 and 2 in the hurricane evacuation survey (Appendix A) are targeted at this question. Question 1 asks: During the 2004-2005 hurricane season, did your agency respond to any calls for service to residents in a mandatory evacuation zone during or subsequent to the event? 26 respondents answered yes while 1 answered no. Question 2 asks: Please estimate the percentage of residents that do not evacuate mandatory evacuation zones in your jurisdiction? 1 respondent replied 0-20%, 5 replied 21-40%, 16 replied 41-60%, 4 replied 61-80%, and 1 replied 81-100%. The findings of the survey are consistent with the research in that the responses are consistent with the numbers found in the polls located in the literature review.

### Research Question #2

How do we evacuate those with special needs? The initial research into the problem revealed that there were widespread deficiencies with regards to evacuation of special needs residents. Existing CEMP's placed little emphasis on this component and those that did have plans were flawed.. These survey questions were targeted at determining if this population was adequately addressed in CEMP's and identifying the most effective ways to accomplish the task of evacuating this group. Questions 3 and 4 from the hurricane evacuation survey (Appendix A) address research question #2. Question 3 asks: Does your organizations Comprehensive Emergency Management Plan address the evacuation of special needs residents? 19 respondents answered yes and 8 answered no. Question 4 asks: If the answer to question 3 is yes, what form of transportation is used? 5 respondents answered private contractors, 10 answered public transit/school busses, 2 answered EMS providers, and 2 answered a combination of the above. The findings of the survey are consistent with the research located in the literature review in that special needs residents do seem to be covered in local CEMP's. The method of transportation results from the survey were also consistent with the research as neither really identified any method that was more widely used.

### Research question # 3

What is being done at the local, state, and federal level to address the problem? These questions were posed to determine weather or not the government was doing enough with regards to policy, programs, and financial support. Questions 5 and 6 in the hurricane evacuation survey (Appendix A) are targeted at research question 3. Question 5 asks: Does your local jurisdiction maintain a database of special needs residents? 7 respondents answered yes and 20 answered no. Question 6 asks: Has your local organization received

any local, state, or federal grants that can be utilized to aid in hurricane evacuation? 22 respondents answered yes and 5 answered no. The results of the survey for question 5 were not consistent with the literature review. Based on the research, it appears this process is being widely used however, the survey results show a lack of focus on this area among the participants in our area. The responses to question 6 in the survey are consistent with the research in that grant funding seems adequate and is effectively reaching the local level.

#### Research question #4

What public education efforts are currently in place to address the problem? The research revealed that there were limited ways that all levels of government are working to educate the public. The survey questions were posed to gauge awareness of current public education efforts as well as identifying successful future efforts.

Questions 7 and 8 of the hurricane evacuation survey (Appendix A) were targeted at research question #4. Question 7 asked: Are you aware of any ongoing public education efforts aimed at increasing compliance with hurricane evacuations? 6 respondents answered yes and 21 answered no. This revealed that there was a lack of awareness of the current efforts identified in the research. It also confirmed the information gathered in the literature review that showed that existing public education efforts are focused on impending storms and are not ongoing. Question 8 asked:

Which of the following public education efforts do you think would be most effective in increasing mandatory evacuation compliance? 7 respondents answered TV/radio ads, 1 answered utilizing the reverse 911 messaging system, and 11 answered having open houses in shelters prior to hurricane season. This information discovered in the

survey is not consistent with the information found in the literature review. It suggest that a non traditional way of public education such as open houses at designated shelters, may be more effective than radio or TV spots.

### Discussion

When determining how widespread the problem is, I looked first at the study completed by Harvard University. This study is of particular relevance because it was narrowly focused on residents located within fifty miles of the coastline in states are at high risk of a hurricane. The focus on this demographic is clearly consistent with the City of Delray Beach Jurisdiction. When asked, “If government officials said that you had to evacuate the area because there was going to be a major hurricane in the next few days, would you leave the area or would you stay?” Thirty three percent responded that they would stay. (Harvard, 2006) The answer to this question in the survey is very telling. It is also consistent with other polls cited in the literature review section. The local poll conducted by the Charleston newspaper yielded similar responses. The question was posed that if an evacuation order was declared, would you leave? Their poll had 647 responses with fifty seven percent answering that they would not leave. (Charleston.net, 2008) Looking back at hurricane Katrina in New Orleans it is estimated that in the city of 1.3 million people, only 1 million evacuated. (CNN, 2005)

The hurricane evacuation survey (Appendix A) yielded results that are clearly consistent with the research. With all but one of the respondents replying that they had to respond to calls during or just after a hurricane in a mandatory evacuation zone we can conclude that there is a widespread problem. When asked to estimate the percentage of residents that do not evacuate mandatory evacuation zones in your jurisdiction, a majority

of respondents answered between 41 and 60 percent. (Appendix B) The hurricane evacuation survey supports the findings of the Harvard survey as well as the Charleston survey. Additionally, these estimates are consistent with the actual experience with Hurricane Katrina. From this data, we can deduce that the problem is clearly widespread locally as well as nationally.

With regards to how we evacuate those with special needs we must first start with a definition of what a special needs person is. The research showed vastly different definitions for what a special needs person is. The City of Jacksonville defines a special needs patient as, “A person qualifying for special needs is someone who is medically dependent on electricity. (COJ, 2008) The State of Missouri defines a special needs person as any individual, group, or community whose age, physical, mental, emotional, cognitive, cultural, ethnic, socio-economic status, language, citizenship status, or any other circumstance creates barriers to understanding or the ability to act/react in the manner in which the general population has been requested to proceed during all phases of emergency management.(Davidson, 2005) These definitions are vastly different and adoption of either one will greatly affect who is classified as a special needs person. From this part of the research I believe there needs to be one common definition of what a special needs person is, in order to coordinate efforts at all levels of government to accomplish this task.

(No Person Left behind, 2005) With more than one third of Florida’s 6,341,130 households having at least one person with special needs, there is clearly a need to adequately address this segment of the population in the local CEMP’s. The Florida Healthcare Association review of the 2004-2005 hurricane seasons revealed that this

segment of the population was addressed in CEMP's it was inadequate. (Alphasano, 2007) A related article also addressed the shortfalls in local emergency management plans with regards to special needs evacuees and focused on the transportation component. It takes a look at the role that transit systems could play in evacuating special needs residents but cites one of the shortcomings is that they are not currently eligible for FEMA reimbursement. (Medical News Today, 2008) This is significant as it may adversely affect decisions particularly with our current budget crisis. I believe this part of the research is consistent with the results of the evacuation survey. (Appendix B) The survey revealed that a clear majority of CEMP's do address special needs evacuation. If further study was to be completed, an evaluation of the effectiveness of this component of the plan would be the focus.

The research showed varying approaches to evacuating special needs patients. Some had pre arranged contracts with private providers however, it was discovered that numerous agencies had contracted with the same provider. (Alphasano, 2007) Further investigation revealed that this provider did not have the capacity to service all that they had entered into contracts with. The Miami Dade County approach combined different means of transportation based on the specific needs of the individuals. More mobile residents can be transported by school busses, and those that need additional assistance are to be transported by special transit busses, private ambulances and Fire Rescue. (MiamiDade.gov, 2008) Both the research, as well as the results of the evacuation survey, (Appendix B) reveal the widely varying approach to the method of transportation used. 8 of the 27 respondents CEMP's did not specifically identify which method of transportation was to be utilized to transport special needs residents. Those that did



relied heavily upon existing public transportation resources. Relatively few relied on EMS providers and private contractors. Surprisingly, only two respondents relied upon a combination approach to achieving this goal.

With regards to what is being done at the local level to deal with the problem, the literature review identified a local pre registration process that was available on many local government websites. The research found that although this is available it is underutilized. In the case of the Alachua County Florida plan where there were 450 pre registered special needs patients, the county identified thousands of others who were not registered. (U.S. DOT, 2006) With this lack of compliance with the pre registration process it is clear why only 7 of the 27 respondents to the evacuation survey replied that their jurisdiction maintains a database of special needs residents. (Appendix B) Local governments are not willing to invest resources in an endeavor with little reward. I personally believe that more effort is needed in this area. Pre registration of special need residents before an emergency can pay off tremendously. If an accurate count of clients can be obtained, than proper planning for the efficient use of resources can take place. We can avoid a situation like the one in New Orleans where 200 school buses were submerged and not utilized, when special needs residents were not evacuated prior to the storm. No one would be asking, “Why weren’t those busses sent street by street to pick people up prior to the storm.” (Myers, 2005)

The literature review information regarding state and local programs revealed that ambitious programs were being implemented to deal with hurricane evacuation. Some of these programs are a result of public and private partnerships and appear to be adequately funded. The State of Texas and ATT joined together to develop an evacuee tracking

program after 470,000 evacuees ended up in Texas, including 9,000 special needs cases and 2,000 children who arrived without parents following Hurricane Katrina.

(Mysabusiness.com, 2007) The State of Florida's GIS program graphically displays the status of roadway traffic, shelter information, logistics area locations and command posts.

(U.S. DOT, 2006) These types of programs are expensive to deploy however, they serve an important purpose with regards to evacuation. I believe they show the public there is organization to the process and might increase future compliance with mandatory evacuation orders. The literature review and the survey results, (Appendix B) tend to agree that there seems to be adequate funding at the state and federal level to help with hurricane evacuation. A clear majority of the respondents replied that their organization had been the recipient of grants to aid in this function. Although progress has been made, a continuation of this funding is necessary to continue to gain further ground. The annual DHS budget for this purpose has increased dramatically since 2006 from \$3.6 billion to \$7.6 billion this year. (Abramson, 2008)

Although there are some public education efforts that exist to address hurricane evacuation, most seemed to be narrowly focused to coincide with an approaching storm. The State of Florida aired public safety announcements on television and radio only when there were active storms. These announcements revolved around a caller requesting a response and a dispatcher telling her they would not respond. (Floridadisaster.org, 2006) Although the announcement delivered a strong message, it took place just prior to an impending storm and left little time for a person to plan. The literature review reveals the same situation regarding public education at the federal level. The CDC site was extremely comprehensive but focused only on canned messages local officials could use

in the face of an existing storm. (CDC, 2008) I personally feel these attempts occur too late in the process of a storm to be effective.

A review of the information gained in the evacuation survey reveals that we are not doing a good job with our public education efforts regarding hurricane evacuation. A clear majority of the respondents to the survey replied that they are not aware of any ongoing public education efforts regarding hurricane evacuation. (Appendix B) Additionally, the survey revealed that a different approach to public education may be warranted. Even though most of the current programs are based on television and radio announcements, the majority of respondents to the survey identified that open houses in designated hurricane shelters would provide for better compliance with mandatory evacuation orders. (Appendix B)

The organizational implications of this study will help to improve our organizations effectiveness in achieving higher compliance with mandatory evacuation orders. From this study, recommendations will be made to improve planning and educational methods to deal with the problem.

### Recommendations

Based on a thorough review of information gathered in this study, the following recommendations are made. The department must recognize that a significant number of residents in our jurisdiction do not comply with mandatory evacuation orders. This unnecessarily exposes those residents as well as members of our organization to an unacceptable level of risk. The organization must be proactive in dealing with the problem by first updating the CEMP and addressing this exposure. The issue of addressing those with special needs should also implemented. I would recommend that

the organization begin with developing a pre registration program consisting of those with special needs. Although the use of the internet and websites is convenient, based on the research, this is not the most effective means to reach this segment of the population. The organization could make better use of Community Emergency Response Teams to target senior communities to provide registration. Once this information is compiled, the organization could then tackle the transportation component. Based on the study I would recommend a combination approach to the transportation of those with special needs. A plan that utilizes public transportation, private contractors, and EMS providers, would be the most efficient and provide for redundancy if one component fails.

The organization should continue to seek grant opportunities at the local, state, and federal levels to obtain funding for future projects that are targeted at aiding in hurricane evacuation. Based on the research, significant increases have been made annually and we can reasonably project that those increases will continue to provide those opportunities. We must be prepared to devote staff time and position our organization to effectively compete for them.

I would recommend that the organization make a considerable effort to develop an effective public education program to address the problem. We have clearly have not done enough to educate the public as to the true dangers of remaining in these areas during a storm. An effective program should be ongoing and visible, even outside of the recognized hurricane season. Additionally, the program should incorporate exposure outside of the normal radio and television spots. The issue of open houses at designated hurricane shelters prior to storm season emerged as a potentially successful method to increase compliance with mandatory evacuations. I would recommend the

implementation of all three along with partnering with other organizations to synergize our efforts. A well coordinated campaign will have the desired effect of decreasing the problem.

In closing, the results of this study clearly show that the failure to heed mandatory evacuation orders is a growing and significant problem, and there is significant interest in increasing compliance. The researcher would recommend to future readers of this paper that the potential dangers resulting from the failure to evacuate mandatory evacuation zones is increasing with coastal development. The lack of an active hurricane season for even one year will cause the focus to shift from this subject. Constant efforts must be made to educate the public about the dangers associated with the failure to evacuate.

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Appendix A

## Hurricane Evacuation Survey

1) **During the 2004-2005 hurricane seasons, did your agency respond to any calls for service to resident in an mandatory evacuation zone during or subsequent to the event?**

- a. Yes
- b. No

2) **Please estimate the percentage of residents that do not evacuate mandatory evacuation zones in your jurisdiction?**

- a. 0-20%
- b. 21-40%
- c. 41-60%
- d. 61-80%
- e. 81-100%

3) **Does you organizations Comprehensive Emergency Management Plan address the evacuation of special needs residents?**

- a. Yes
- b. No

- 4) **If the answer to question 3 is yes, what form of transportation is used?**
- a. Private contractors
  - b. Public transit/school busses
  - c. EMS providers
  - d. A combination of the above
- 5) **Does your local jurisdiction maintain a database of special needs residents?**
- a. Yes
  - b. No
- 6) **Has your organization received any local, state, or federal grants that can be utilized to aid in hurricane evacuation?**
- a. Yes
  - b. No
- 7) **Are you aware of any ongoing public education efforts aimed at increasing compliance with hurricane evacuations?**
- a. Yes
  - b. No

8) **Which of the following public education efforts do you think would be most effective in increasing mandatory evacuation compliance?**

- a. TV/Radio ads
- b. Reverse 911 messaging
- c. Open houses in shelters prior to hurricane season

## Appendix B

## Hurricane Evacuation Survey Results

1) **During the 2004-2005 hurricane seasons, did your agency respond to any calls for service to resident in an mandatory evacuation zone during or subsequent to the event?**

a.	Yes	26
b.	No	1

2) **Please estimate the percentage of residents that do not evacuate mandatory evacuation zones in your jurisdiction?**

a.	0-20%	1
b.	21-40%	5
c.	41-60%	16
d.	61-80%	4
e.	81-100%	1

3) **Does you organizations Comprehensive Emergency Management Plan address the evacuation of special needs residents?**

a.	Yes	19
b.	No	8

- 4) **If the answer to question 3 is yes, what form of transportation is used?**
  - a. Private contractors 5
  - b. Public transit/school busses 10
  - c. EMS providers 2
  - d. A combination of the above 2
  
- 5) **Does your local jurisdiction maintain a database of special needs residents?**
  - a. Yes 7
  - b. No 20
  
- 6) **Has your organization received any local, state, or federal grants that can be utilized to aid in hurricane evacuation?**
  - a. Yes 22
  - b. No 5
  
- 7) **Are you aware of any ongoing public education efforts aimed at increasing compliance with hurricane evacuations?**
  - a. Yes 6
  - b. No 21

8)           **Which of the following public education efforts do you think would be most effective in increasing mandatory evacuation compliance?**

- |    |   |    |
|----|---|----|
| a. | TV/Radio ads                                      | 7  |
| b. | Reverse 911 messaging                             | 1  |
| c. | Open houses in shelters prior to hurricane season | 11 |